

Appl No. 10/014,853
Reply to Office Action of November 13, 2003

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claims 1-35. (Canceled)

Claim 36. (New) A method for separating zeolite crystals from an aqueous medium, comprising:

- (a) preparing an aqueous alkaline mother liquor containing, as reagents for zeolite preparation, a silica source, optionally alumina and/or other metal oxide sources and/or an organic templating agent;
- (b) hydrothermally treating said mother liquor thereby obtaining a suspension containing:
 - zeolite crystals,
 - reagents of the zeolite preparation not transformed into zeolitic crystalline phase during the hydrothermal treatment and optionally oxides generated by them,
 - optionally organic templating agent and optionally product generated by the decomposition of said sources of silica and alumina;
- (c) treating the zeolite crystal containing suspension with an acid until the suspension attains a pH ranging from 3-8; and
- (d) filtering or decanting the resulting mixture to isolate the zeolite crystals in mixture with oxides generated by said reagents of the zeolite preparation not transformed into zeolitic

Appl No. 10/014,853
Reply to Office Action of November 13, 2003

crystalline phase.

Claim 37. (New) The method according to Claim 36, comprising:

- (a) preparing an aqueous alkaline mother liquor containing alumina and silica precursors and optionally an organic templating agent;
- (b) hydrothermally treating said mother liquor thereby obtaining a suspension containing zeolite crystals, silicates or amorphous silica aluminate and
 - optionally (i) organic templating agent and product generated by decomposition of the organic templating agent and optionally (ii) alcohol derived by the decomposition of said silica and alumina precursors;
- (c) treating the alkaline zeolite crystal containing suspension with an acid until the suspension attains a pH ranging from 3-8; and
- (d) filtering or decanting the resulting mixture to isolate the zeolite crystals.

Claim 38. (New) The process according to Claim 36, which further comprises:

in step (c) treating the suspension with said acid and with a material selected from the group consisting of a clay, an oxide and a precursor of an oxide which generates the oxide by hydrolysis; and

in step (d) filtering or decanting the resulting mixture to isolate said zeolite crystals in a mixture with the oxide.

Claim 39. (New) The process according to Claim 36, wherein said acid of step (c) is an

acid precursor which is capable of simultaneously generating an acid and a binder by hydrolysis.

Claim 40. (New) The process according to Claim 36, wherein said pH ranges from 3 to 6.

Claim 41. (New) The process according to Claim 36, wherein said acid is selected from the group consisting of acetic acid, hydrochloric acid, nitric acid, formic acid, propionic acid and oxalic acid.

Claim 42. (New) The process according to Claim 41, wherein said oxide is selected from the group consisting of silica, silica-alumina and alumina.

Claim 43. (New) The process according to Claim 41, wherein said precursor of an oxide is selected from the group consisting of aluminum acetylacetone, alkylaluminates, alkylsilicates and combinations thereof.

Claim 44. (New) The process according to Claim 43, wherein said precursor which simultaneously generates acid and said oxide is selected from the group consisting of $\text{Al}(\text{NO}_3)_3$, $\text{Al}(\text{SO}_4)_3$, silicic acid, silicon or aluminum halides and $\text{Al}(\text{CH}_3\text{COO})_3$.

Claim 45. (New) The method according to Claim 36, wherein the content of said oxide in the separated zeolite product ranges from 1 to 50 % by weight based on the amount of zeolite.

Claim 46. (New) A process for preparing zeolite catalysts in acid or ammonia form, which comprises:

- (a) preparing an aqueous alkaline mother liquor containing alumina as reagents for zeolite preparation, a silica source, optionally alumina and/or other metal oxide sources and/or an organic templating agent;
- (b) hydrothermally treating said mother liquor thereby obtaining a suspension containing:
 - zeolite crystals,
 - reagents of the zeolite preparation not transformed into zeolitic crystalline phase during the hydrothermal treatment and optionally oxides generated by them,
 - optionally organic templating agent and optionally product generated by the decomposition of said sources of silica and alumina;
- (c) treating the suspension of zeolite crystals in the crystallization mother liquor containing the crystals with an aqueous acid solution to change the pH to a pH ranging from 3-8;
- (d) filtering or decanting the resulting mixture to separate the zeolite crystals in mixture with oxides generated by said reagents of the zeolite preparation not transformed into zeolitic crystalline phase;
- (e) drying the crystals;
- (f) calcining the crystals;
- (g) effecting an ion exchange in the zeolite crystals in an aqueous solution containing an acid or ammonium salt;
- (h) filtering or decanting the ion exchange zeolite crystals and subjecting the crystals to washing;

(i) drying the crystals; and
(j) calcining the crystals to remove ammonium ion therefrom in the event said ion exchange is conducted with ammonium salt and the acid form of the zeolite catalyst is required.

Claim 47. (New) A process for preparing zeolitic catalyst in acid form, which comprises:

- (a) preparing an aqueous alkaline mother liquor containing, as reagents for zeolite preparation, a silica source, optionally alumina and/or other metal oxide sources and/or an organic templating agent;
- (b) hydrothermally treating said mother liquor thereby obtaining a suspension containing:
 - zeolite crystals ,
 - reagents of the zeolite preparation not transformed into zeolitic crystalline phase during the hydrothermal treatment and optionally oxides generated by them,
 - optionally organic templating agent and optionally product generated by the decomposition of said sources of silica and alumina;
- (c) treating the alkaline suspension of zeolite crystals in the mother liquor with an acid until the suspension attains a pH ranging from 3 to 8;
- (d) filtering or decanting the resulting mixture to isolate the zeolite crystals in mixture with oxides generated by said reagents of the zeolite preparation not transformed into zeolitic crystalline phase;
- (e) exchanging the zeolite with an aqueous solution containing an acid or ammonium salt;
- (f) filtering or decanting the zeolite crystals to effect separation thereof;
- (g) drying the zeolite crystals; and

(h) calcining the crystals to remove residual templating agent and ammonium ion in the event the ion exchange reaction is conducted with an ammonium salt, the zeolite product having a tridimensional large or extra-large pore system.

Claim 48. (New) The process according to Claim 46, wherein in step (c), said suspension is treated with a material selected from the group consisting of clay, an oxide and an oxide precursor that generates an oxide by hydrolysis.

Claim 49. (New) The process according to Claim 47, wherein in step (c), said suspension is treated with a material selected from the group consisting of clay, an oxide and an oxide precursor that generates an oxide by hydrolysis.

Claim 50. (New) The process according to Claim 46, wherein said acid in step (c) is added in the form of a precursor which generates said acid and an oxide by hydrolysis.

Claim 51. (New) The process according to Claim 47, wherein said acid in step (c) is added in the form of a precursor which generates said acid and an oxide by hydrolysis.

Claim 52. (New) A process for preparing zeolitic catalysts in extruded form, which comprises:

(a) preparing an aqueous alkaline mother liquor containing alumina as reagents for zeolite preparation, a silica source, optionally alumina and/or other metal oxide sources and/or

an organic templating agent;

(b) hydrothermally treating said mother liquor thereby obtaining a suspension containing:

- zeolite crystals,

- reagents of the zeolite preparation not transformed into zeolitic crystalline phase during the hydrothermal treatment and optionally oxides generated by them,

- optionally organic templating agent and optionally product generated by the decomposition of said sources of silica and alumina;

(c) treating the suspension of zeolite crystals in the crystallization mother liquor containing the crystals with an aqueous acid solution to change the pH to a pH ranging from 3-8;

(d) filtering or decanting the resulting mixture to separate the zeolite crystals in mixture with oxides generated by said reagents of the zeolite preparation not transformed into zeolitic crystalline phase;

(e) drying the crystals;

(f) calcining the crystals;

(g) effecting an ion exchange in the zeolite crystals in an aqueous solution containing an acid or ammonium salt;

(h) filtering or decanting the ion exchange zeolite crystals and subjecting the crystals to washing;

(i) drying the crystals; and

(j) calcining the crystals to remove ammonium ion therefrom in the event said ion exchange is conducted with ammonium salt and the acid form of the zeolite catalyst is required; and

(k) extruding the crystals in a mixture with a binder.

Claim 53. (New) A process for preparing zeolitic catalysts in extruded form, which comprises:

- (a) preparing an aqueous alkaline mother liquor containing, as reagents for zeolite preparation, a silica source, optionally alumina and/or other metal oxide sources and/or an organic templating agent;
- (b) hydrothermally treating said mother liquor thereby obtaining a suspension containing:
 - zeolite crystals ,
 - reagents of the zeolite preparation not transformed into zeolitic crystalline phase during the hydrothermal treatment and optionally oxides generated by them,
 - optionally organic templating agent and optionally product generated by the decomposition of said sources of silica and alumina;
- (c) treating the alkaline suspension of zeolite crystals in the mother liquor with an acid until the suspension attains a pH ranging from 3 to 8;
- (d) filtering or decanting the resulting mixture to isolate the zeolite crystals in mixture with oxides generated by said reagents of the zeolite preparation not transformed into zeolitic crystalline phase;
- (e) exchanging the zeolite with an aqueous solution containing an acid or ammonium salt;
- (f) filtering or decanting the zeolite crystals to effect separation thereof;
- (g) drying the zeolite crystals; and
- (h) calcining the crystals to remove residual templating agent and ammonium ion in the

Appl No. 10/014,853

Reply to Office Action of November 13, 2003

event the ion exchange reaction is conducted with an ammonium salt, the zeolite product having a tridimensional large or extra-large pore system; and

- (i) extruding the crystals in a mixture with a binder.